Creating Great Java Applications On Mac OS X

Session 608

Creating Great Java Applications On Mac OS X

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Introduction

- Java applications are first-class citizens on Mac OS X
- Many available tricks to improve user experience
- Numerous deployment options for end user applications

- J2SE 1.4.1
  - Available from Software Update
  - J2SE 1.4.1 Developer Update
    - https://connect.apple.com

What You'll Learn

- Where things are
- Aqua Look-and-Feel for Swing
- Cross Platform UI Programming
- Coding for Mac OS X
- Mac OS X Runtime Properties
- Deployment Options on Mac OS X

J2SE 1.4.1

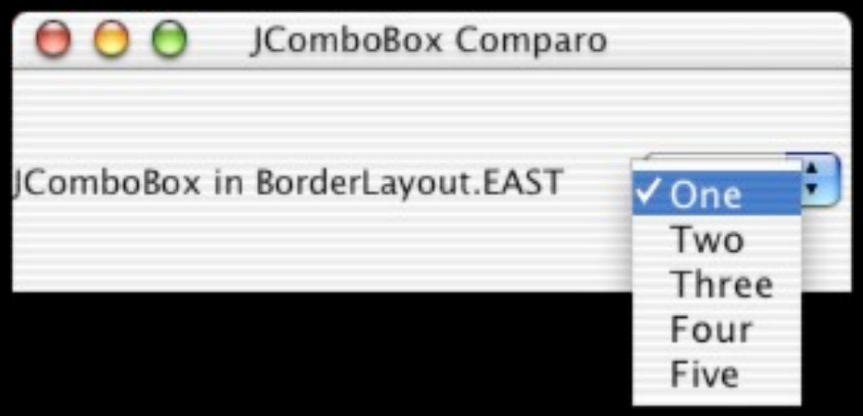
- Java Home
  - /Library/Java/Home
- Extension & JNI Directories
  - /Library/Java/Extensions
  - ~/Library/Java/Extensions
- Includes
  - /System/Library/Frameworks/JavaVM.framework/Headers
    - XCode: just add JavaVM.framework

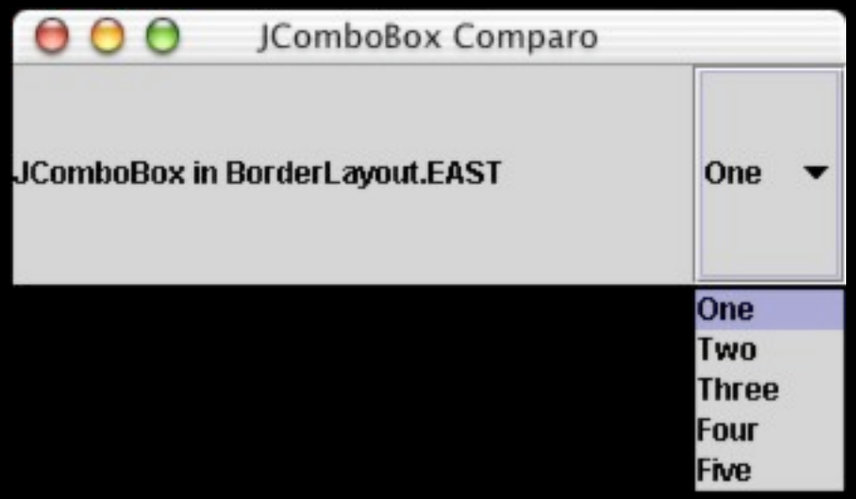
Swing Aqua LAF

- Aqua is the Default
  - Screen Menu Bar
  - Animated Default Buttons
  - Progress Bar Animation

Swing Aqua LAF

Component sizing





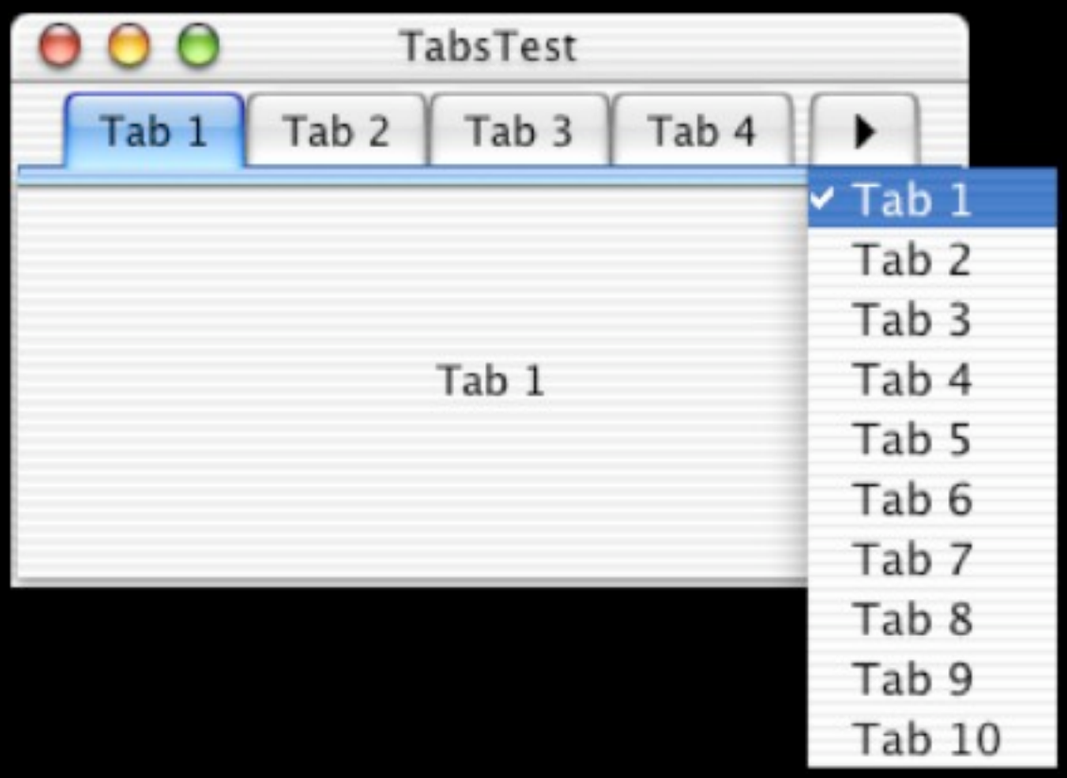
- Sized to Aqua HIG
  - JComboBoxes
  - JButtons
  - Tabs

Swing Aqua LAF

JTabbedPanes

New in 1.4!

- Tabs in aqua are single-row
- Navigation control if tabs grow beyond frame



Swing Aqua Look-and-Feel Demo

Cross Platform UI Programming

- Working with Components
- Using JDesktopPane
- Menu Shortcut Keys
- Contextual Menus and Mouse Clicks
- File Access
- Image Formats

Working With Components

- Styling components
  - Ask L&F for colors and icons
    - `UIManager.get("ComboBox.background")`
    - `UIManager.get("JCheckBoxMenuItem.checkIcon")`

- Sizing and placing components
  - Don't anticipate specific sizing or spacing
  - Use Layout Managers!
    - Adjust for size, spacing across L&Fs
    - Watch respect for preferredSize

JDesktopPane vs. Multiple Frames

- Just say no to JDesktopPane
  - No equivalent in Carbon/Cocoa
  - Very confusing!
- Plenty of alternatives
  - Multiple frames (Mac OS X standard)
  - Single-frame dynamic container

JDesktopPain

Menu Shortcut Keys

- Ask AWT for menu modifiers
  - `Toolkit.getMenuShortcutKeyMask()`

- Consult Aqua HI Guidelines for common shortcuts
  - "S" for Save, "O" for Open, etc.

- No Mnemonics in Aqua HIG
  - Screen menubar does not paint them

Contextual Menus and Mouse Clicks

- `isPopupTrigger()`
  - Could be Ctrl-click or right-click
  - Check in `mousePressed` and `mouseReleased`
    - Mac uses one, Windows uses the other

- Ctrl-left is not BUTTON2
  - Functional result is same, but different events

File Access

- Don’t hardcode file paths!
  - Slashes and drive letters are evil

- Use `file.separator` System property
- Use `user.dir` and `user.home`
- Include image files on classpath
  - Access using `ClassLoader.getSystemResource()`

Image Formats

- IndexColorModel will be slower
- Images with Alpha are preferred

- BufferedImage
  - Component.createImage
  - GraphicsConfiguration.createCompatibleImage
  - ColorModel
- Similar methods for VolatileImage

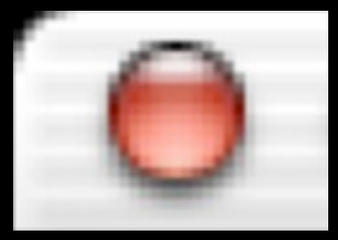
Want More Information? Go To:
625 Maximizing Java Performance on Mac OS X

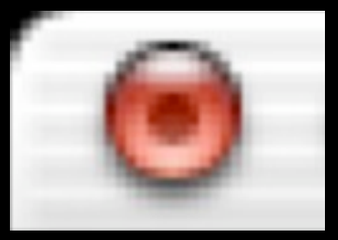
Coding for Mac OS X

- Illustrating document changes
- Scroll Bar Policies
- Toolbar Buttons
- File Dialogs
- Apple EAWT
  - Application Menu
  - Opening Documents
- Apple EIO

Illustrating Document Changes

- “dirty” Indicator on JFrame close button
  - “windowModified” client property
  - `getRootPane().putClientProperty(”windowModified”, ...)`
  - `Boolean.TRUE` to dirty window, `FALSE` to clear close button





Scroll Bar Policies

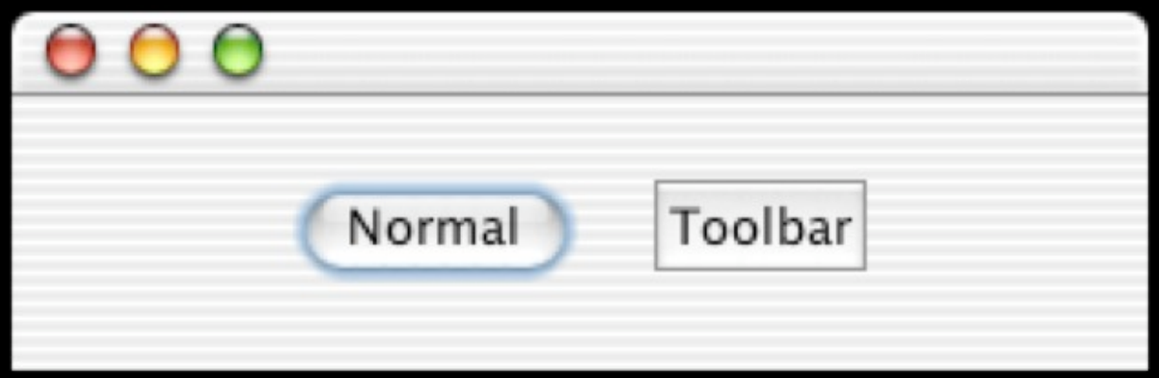
- Always show relevant JScrollPane scroll bars
- Scroll bars will show as disabled

```
JScrollPane jsp = new JScrollPane();
...
jsp.setVerticalScrollBarPolicy(JScrollPane.VERTICAL_SCROLLBAR_ALWAYS);
jsp.setHorizontalScrollBarPolicy(JScrollPane.HORIZONTAL_SCROLLBAR_ALWAYS);
```

Toolbar Buttons

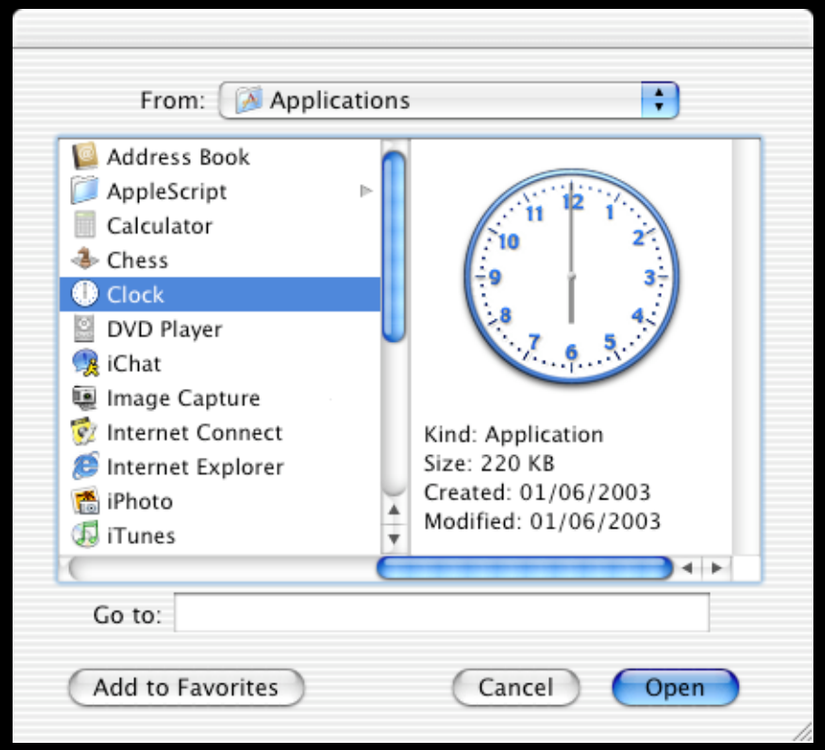
- Toolbar button appearance without a toolbar
  - `JButton.buttonType` client property

- Use on JButtons or JToggleButtons
  - `myButton.putClientProperty(”JButton.buttonType”, “toolbar”);`



File Dialogs

- `java.awt.FileDialog` preferred on Mac OS X
  - Column View
  - Native Aqua format
  - .app / .pkg file selection
    - `apple.awt.use-file-dialog-packages` System property
      - Treat bundles as files, not folders



Apple Extended AWT

- Using the Application Menu
  - com.apple.eawt.Application
    - `setEnabledPreferencesMenu`
    - `addApplicationListener`
  - com.apple.eawt.ApplicationAdapter
    - Respond to items in Application menu
      - About <AppName>...
      - Preferences...
      - Quit

Apple Extended AWT

- Handling System Apple Events (ApplicationAdapter)
  - OpenApplication
  - ReOpenApplication (Dock activation)
  - OpenFile
    - Register document types in Info.plist
  - PrintFile
- Mouse Screen Coordinates (Application)
  - `getMouseLocationOnScreen`
    - Not bound to Java windows/components

Apple Extended AWT

- CocoaComponent class
  - Embed an NSView in a Java Process
    - Simple native drawing inside Java
    - QDCocoaComponent Sample Code
  - Also available to Applets, Java Web Start

Want More Information? Go To:
620 Java Native Integration on Mac OS X

Apple Extended IO

- com.apple.eio.FileManager
  - Older Mac OS 9 functionality
    - Find folders
    - set / get Type
    - set / get Creator
  - Open URL
    - `Runtime.exec` with “open” is recommended

Coding for Mac OS X

Demo

Maintaining Portability

- Don’t worry about client / runtime properties
  - Platforms not using them won’t check for them
- Don’t lock yourself in!
  - Use reflection to access Apple APIs
    - Extend ApplicationAdapter
    - Load extension using `Class.forName`
    - Same code will run on all platforms!
    - See OSXAdapter sample code

Mac OS X Runtime Properties Deployment Options

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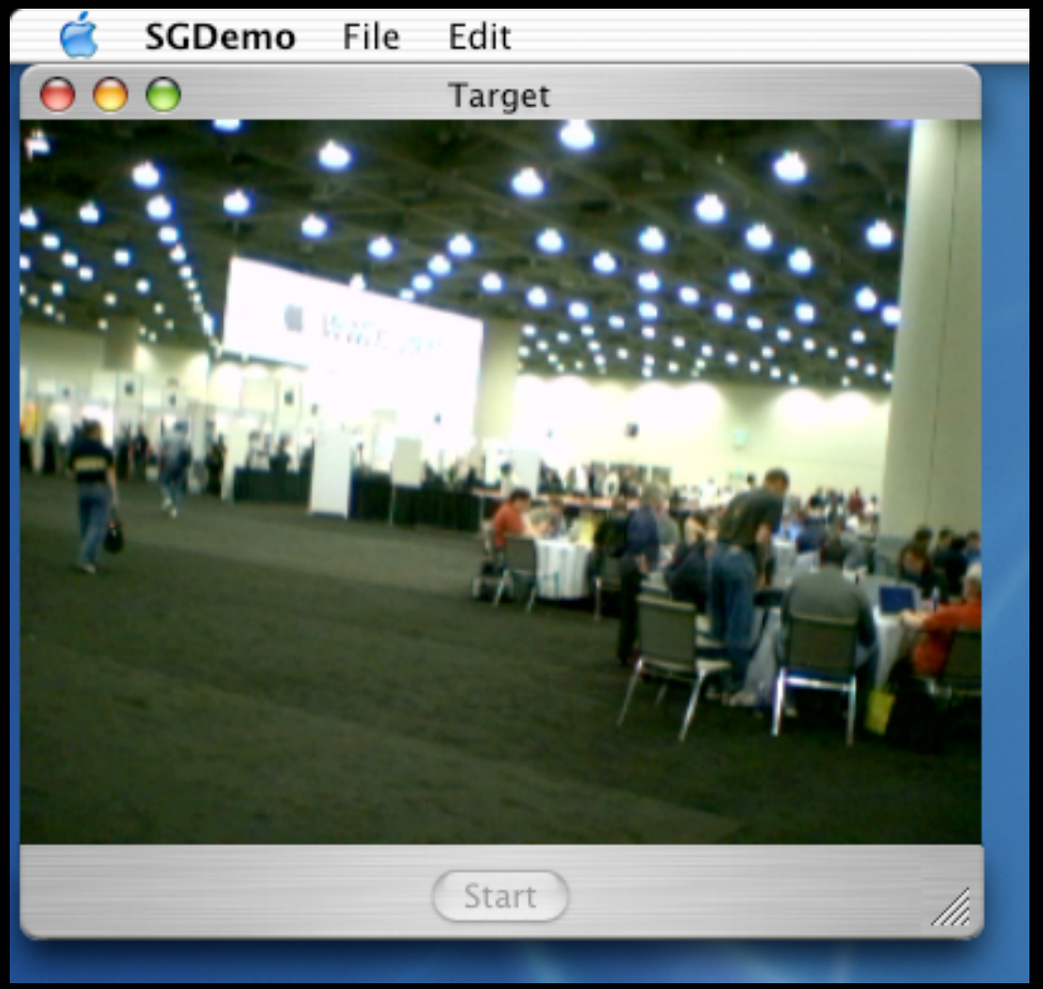
Runtime Properties

- Zero-code changes to Mac OS X behavior
  - "Java" -> "Properties" key of Info.plist
  - Java 1.4.1 Plugin Settings application

Aqua Look-and-Feel

New in 1.4!

- Screen Menu Bar
  - apple.laf.useScreenMenuBar
- Resize Control
  - apple.awt.showGrowBox
- Brushed Metal Look
  - apple.awt.brushMetalLook



Graphics Rendering

- Equivalents for Graphics2D.setRenderingHint
- Rendering Hints are preferred

Rendering Hint	Equivalent Property	Possible Values
KEY_ANTIALISING	apple.awt.antialiasing	False/True
KEY_TEXT_ANTIALIASING	apple.awt.textantialiasing	False/True
KEY_RENDERING	apple.awt.rendering	quality/speed
KEY_INTERPOLATION	apple.awt.interpolation	nearestneighbor/ bilinear/bicubic
KEY_FRACTIONALMETRICS	apple.awt.fractionalmetrics	on/off

Full Screen Mode

Property	Default
apple.awt.fakefullscreen	False
apple.awt.fullscreenusefade	False
apple.awt.fullscreencapturealldisplays	True
apple.awt.fullscreenhidecursor	True

Window Positioning

- Keep windows within screen bounds

Property	Default Value
apple.awt.window.position.forceSafeCreation	False
apple.awt.window.position.forceSafeProgramatticPositioning	True
apple.awt.window.position.forceSafeUserPositioning	False

Deployment Options

- Applets
- Java Web Start
- Application Bundles
- Double Clickable Jar

Applets

- Safari
  - JDK 1.4.1
    - Java Plugin
  - Aqua Look and Feel

- Java 1.4.1 Plugin Settings application
  - Certificates
  - Java Console
  - JAR caching

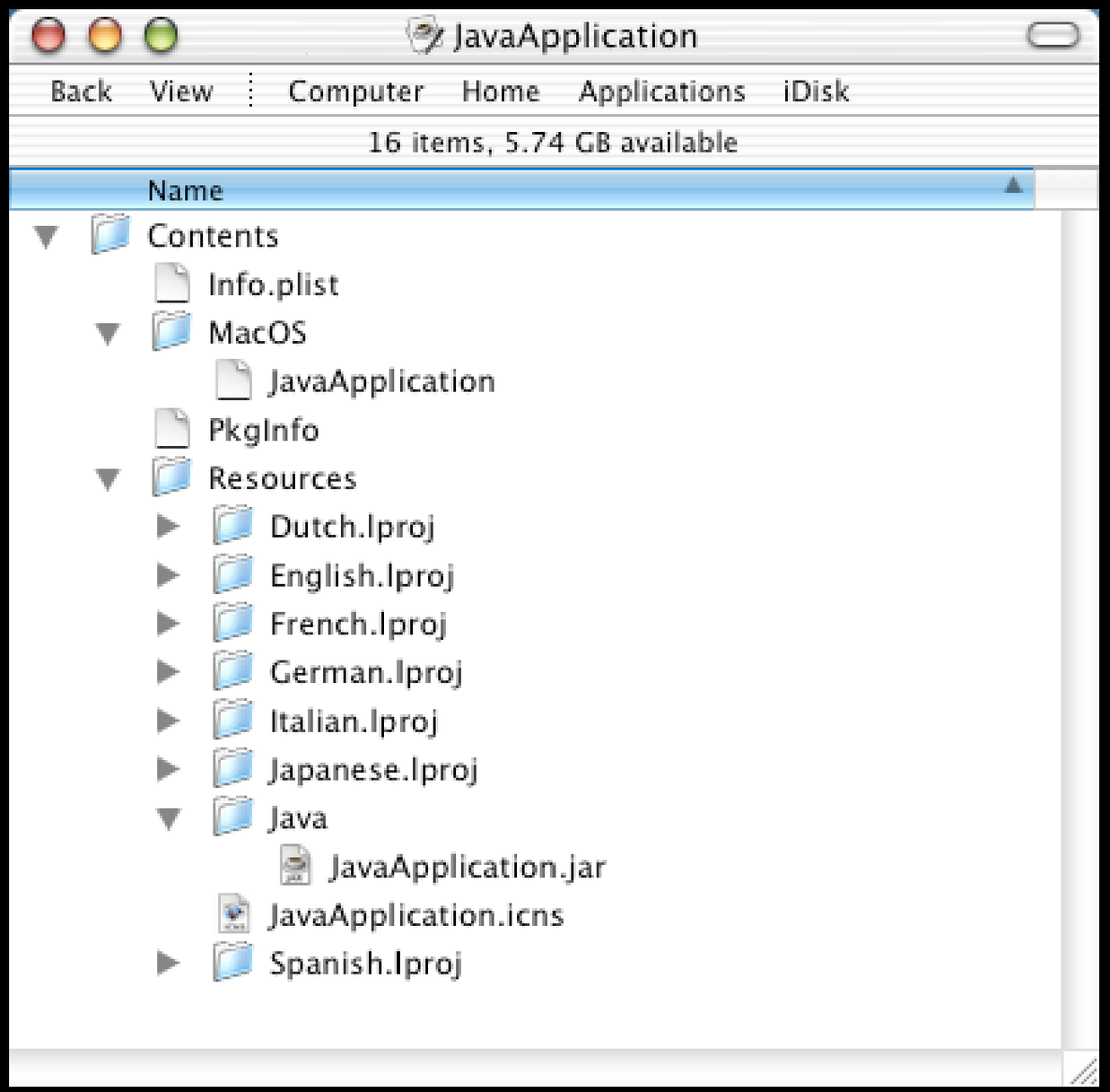
Want More Information? Go To:
619 Java and the Web

Java Web Start

- Web Application deployment
- JNLP icon in Dock
- Java Web Start application
  - Java Console
  - Certificates
  - Create Desktop Application option

Want More Information? Go To:
619 Java and the Web

Application Bundle



Java in the Info.plist

- Java Dictionary in the Info.plist
  - $APP_PACKAGE
  - $JAVAROOT (Contents/Resources/Java)

- Important Keys
  - WorkingDirectory
  - MainClass, ClassPath, Properties, Arguments
  - JVMVersion

JVMVersion Key in Info.plist

KEY	Result
1.4.1	1.4.1 only
1.4*	The highest version of 1.4.x on the platform
1.4+	The highest version above 1.4
1.3.1	1.3.1 Only

Localization

- International panel of System Preferences
  - {local}.lproj

- Info.pList
  - CFBundleName
  - Set app menu title; localizable

Xcode

New

- Develop and Debug
  - Java and Native Code
- Graphical interface to GDB and JDB
- Merge or Copy Jars
- Applications, Applets, Jars

Jar Builder

- Application Bundler
- Existing Java Applications
  - Quick Port solution

Jar Builder

Demo

Reference Library

Documentation

Java 1.4.1 Development for Mac OS X
ADC Home > Documentation > Java >

Java on Mac OS X Frequently Asked Questions
ADC Home > Java

Reference Library

Other Resources

Enterprise Java on Mac OS X
http://developer.apple.com/internet/java/enterprisejava.html

ADC Java Developer Site
http://developer.apple.com/java

Java Developer Documentation
ADC Home > Documentation >

Roadmap

617 Desktop and Server Migration to Mac OS X	Nob Hill Thur., 9:00am
620 Java Native Integration on Mac OS X	Nob Hill Thur., 2:00pm
621 Deploying Xserve	Russian Hill Thur., 3:30pm
FF014 Java Feedback	The Marina Fri., 10:30am

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http://developer.apple.com/wwdc2003/urls.html

Q&A

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http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference